

South Texas Weather Journal

NWS Corpus Christi, TX

2010 Summer Edition

HURRICANE SEASON IS HERE - HAVING A PLAN COULD SAVE YOUR LIFE!

By John Metz — Warning Coordination Meteorologist



It's been 40 years since the last hurricane struck the Coastal Bend area directly in 1970. Her name was Celia and she was classified as a major hurricane with wind speeds of 125 mph and gusts to 160 mph. Tens of thousands of homes were damaged or destroyed in the coastal bend by the winds in Celia and 15 people lost their lives.

Hurricanes are a big deal and can change your life forever. Yet most of the residents of the coastal bend have never been through a major storm. In fact a couple generations of citizens have grown up in this community that have never experienced a major Hurricane. With hurricane season underway, we need to take this time understand what hurricanes are all about and prepare so that we can not only survive these incredible storms but recover

and resume our lives as quickly as possible.

There are four hazards associated with Hurricanes including: Storm Surge, Damaging Winds, Flooding, and Tornadoes. Historically storm surge is the deadliest. Over 1,800 people lost their lives in Hurricane Katrina primarily due to storm surge and the subsequent flooding. The 1900 Galveston Storm claimed 8,000 lives. To understand the power of storm surge, you only need to look at the before and after photo's of the Upper Texas Coast, when Hurricane Ike struck in 2008.

Inside this issue:

Hurricane Preparedness	1-2
40th Anniversary of Celia	2-3
Tropical/Rainfall/Temp Outlook	4
Storm Chasing with an Insider	5
June 2 Severe Storm Recap	6
April Flooding Project	7
Staff Spotlight	8

Hurricane force winds can also be very damaging. Did you know that winds of 125 mph produce a force, of approximately 1250 lbs, on a surface area the size of a sheet of plywood? It is this force that causes our homes and building structures to come apart in major hurricanes.

Tropical storms or Hurricanes that slow down or stall at landfall can produce tremendous rainfall and flooding. Hurricane Beulah did just that in 1967. Beulah produced a record 12 inches of rainfall over the entire coastal bend with some areas receiving as much as 3 feet of rainfall.

Finally tornadoes will be touching down to add insult to injury.

(Continued on page 2)



PREPAREDENESS CONT.

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How do you survive and recover from these powerful storms? It takes planning. First pick up a hurricane preparedness guide at your favorite local store. Or visit the NWS Website at www.weather.gov/corpuschristi and then click hurricane guides.

Next, determine if you live in a storm surge zone and consider purchasing flood insurance. Prepare your home or business by assembling hurricane shutters, keeping your landscaping neat and trimmed, replace aged roofs, windows, and doors with wind resistant varieties, backup important information and store key files offsite.

Whether you stay or evacuate, you will need to assemble a Hurricane Supply Kit and have enough food, water, medicine, and other supplies to last at least 7 days. During Hurricane Ike, the power was out for many areas for up to a month or more. For this reason alone, many folks choose to evacuate to inland areas.

Finally, you need to plan your evacuation. When local officials call for an evacuation, heed those orders or leave sooner if possible. You don't want to find yourself at the tail end of a long line of cars trying to get to San Antonio with hurricane winds knocking on your doorstep. Also keep in mind there are many roadways that leave the coastal bend. So the next time you go out of town, take an alternate route so that you become familiar with the landmarks and gas stations.

A LOOK BACK

The 40th Anniversary of Hurricane Celia

By Tim Tinsley—Senior Forecaster

Forty years ago this summer, Hurricane Celia blasted the Coastal Bend. On August 3rd 1970, Hurricane Celia made landfall near Aransas Pass as a major Category 3 hurricane on the Saffir-Simpson scale with sustained winds of 125 mph. With Celia being a compact storm with a relatively fast movement, widespread heavy rainfall was limited to the Corpus Christi area which received around 7 inches of rain. The storm surge reached 9 feet in the Port Aransas area.

But the notable aspect of Hurricane Celia was the intensity and location of the damaging wind gusts that occurred near the eye of the storm as Celia moved across Corpus Christi Bay. Gusts were estimated to be around 180 mph at Port Aransas and near 160 mph at the Corpus Christi International Airport, in the unusual location of the southwest quadrant of the eye wall. Typically, the stronger winds are in the northeast quadrant of the hurricane with respect to landfall. Damage occurred in streaks as damaging downbursts raked across

(Continued on page 3)

Celia produced wind gusts up to 180 mph

Celia caused \$2.5 Billion in damage (2010 Dollars)

Celia killed 15 and injured 466





A LOOK BACK - CELIA

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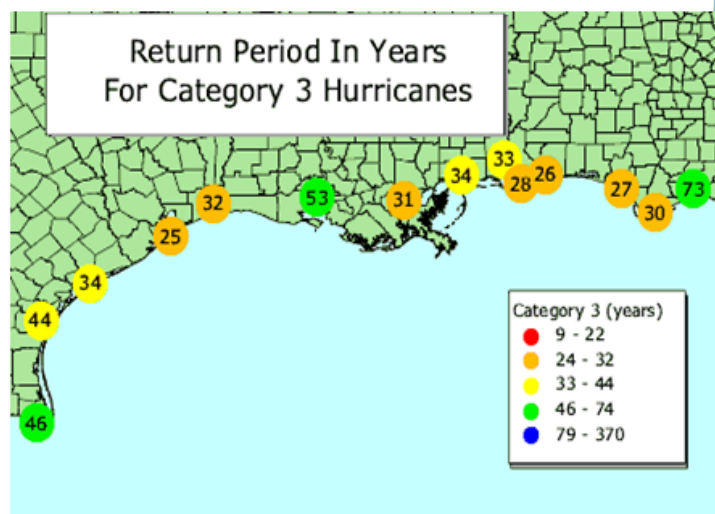
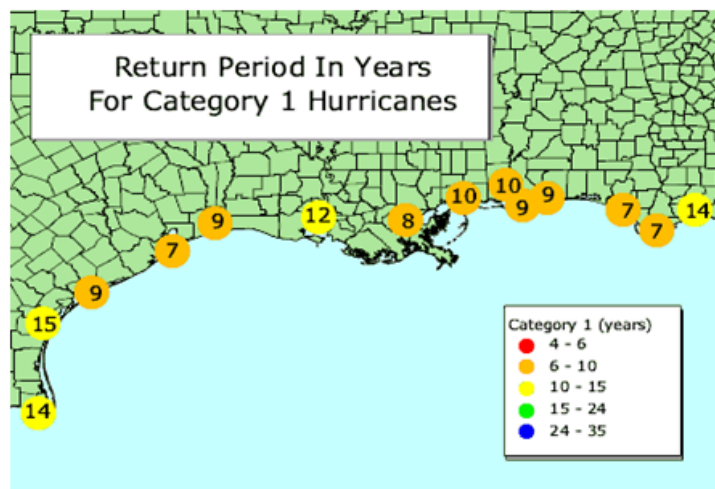
Corpus Christi, Aransas Pass, and Port Aransas. Hurricane Celia caused \$453 million in damages mainly due to wind. This relates to \$2.5 billion in 2010. Hurricane Celia killed 15 people and injured 466 others.

Celia began as a tropical depression west of the Cayman Islands on July 30th and became a tropical storm on the morning of August 1st as it entered the Gulf of Mexico after crossing the western tip of Cuba. Celia quickly intensified to a major hurricane by late afternoon with 115 mph winds, but the intensification was brief as winds decreased to 90 mph later on the evening of the 1st. Although Celia stayed on a steady northwest course, a curve to the right was expected before landfall. Hurricane warnings were issued for the Upper Texas Coast on the morning of August 2nd.

Celia continued on the northwest track and warnings were issued on the morning of the 3rd for Corpus Christi for a strong Category 1 or weak Category 2 hurricane. This left limited time for storm preparation in the area. The worst case scenario occurred when Celia underwent rapid intensification before landfall. The central pressure dropped 39 millibars in 15 hours to 945 millibars, or 27.91 inches of mercury, at landfall in the afternoon. Celia almost reached Category 4 status.

The lessons from Hurricane Celia are still pertinent to residents of the Coastal Bend 40 years later. Advances in hurricane track forecasts are much improved, allowing plenty of time to prepare, but there are still limits in the understanding of the rapid intensification process that can occur with hurricanes. If a hurricane is approaching the region, it is advisable to be prepared for a hurricane two categories stronger than what is forecasted.

Celia was the last major hurricane to make landfall in the Middle Texas Coast. A few hurricanes have approached the Coastal Bend in recent years such as Hurricane Bret, south of Baffin Bay in 1999, and Hurricane Claudette, at Matagorda Bay in 2003. But Hurricane Celia was the last hurricane to make a direct landfall in this area. The following images from the National Hurricane Center show the return period in years for a minimal Category 1 hurricane and a major Category 3 hurricane for locations along the Gulf Coast. The Corpus Christi area is well past the period of 15 years for the return of a minimal hurricane and is approaching the 44 year return mark for a major hurricane. The Mid-Coast region near Matagorda Bay is past the 34 year return period for a major hurricane since Hurricane Carla made landfall in 1961, 49 years ago.



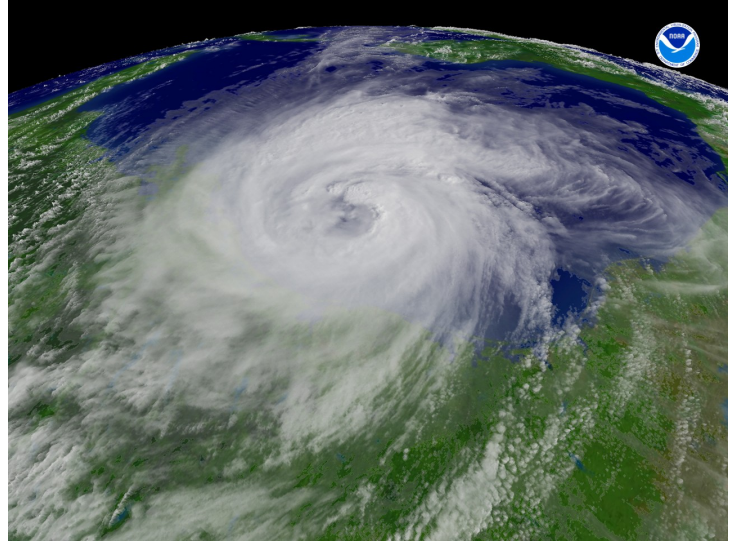


A LOOK AHEAD

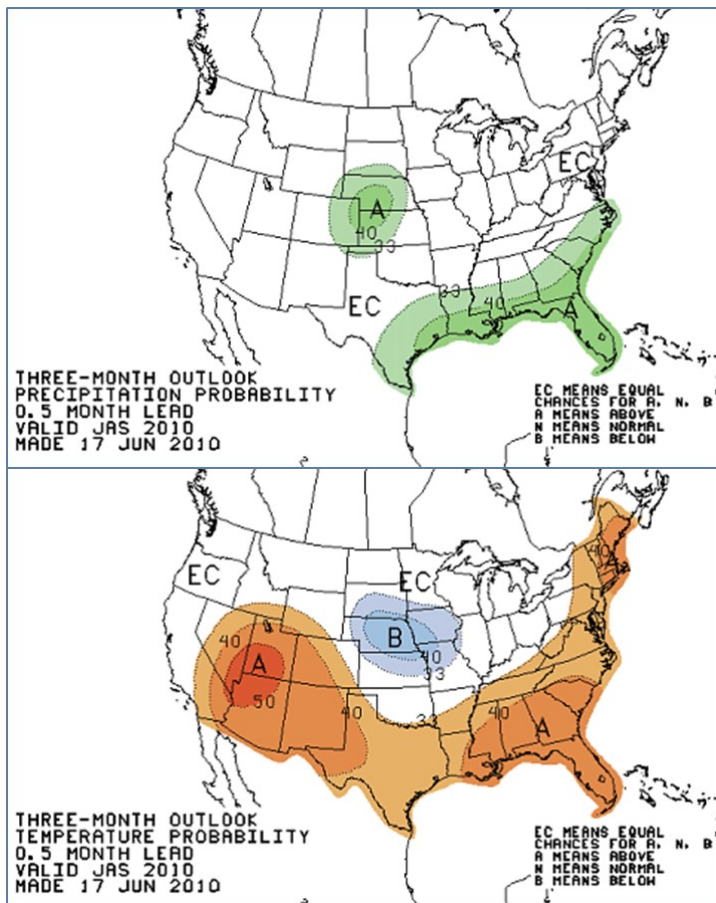
NOAA Expects Busy Atlantic Hurricane Season

An “active to extremely active” hurricane season is expected for the Atlantic Basin this year according to the seasonal outlook issued today by NOAA’s Climate Prediction Center. Across the entire Atlantic Basin for the six-month season, which begins June 1, NOAA is projecting a 70 percent probability of the following ranges:

- **14 to 23 Named Storms** (top winds of 39 mph or higher), including:
- **8 to 14 Hurricanes** (top winds of 74 mph or higher), of which:
- **3 to 7 could be Major Hurricanes** (Category 3, 4 or 5; winds of at least 111 mph)



“If this outlook holds true, this season could be one of the more active on record,” said Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA administrator. “The greater likelihood of storms brings an increased risk of a landfall. In short, we urge everyone to be prepared.”



July-September Precipitation Probability Outlook for South Texas

30-40% Chance Above Normal

July-September Temperature Probability Outlook for South Texas

30-40% Chance Above Normal



INSIDER VIEW

Storm Chasing - NWS Employee Perspective

By Matt Grantham —Meteorologist Intern

Although their purposes may vary, each spring hundreds of storm chasers hit the road in search of some of nature's most powerful storms. Storm chasing is becoming an increasingly popular activity for people everywhere including researchers, meteorologists, tourists, thrill seekers, and local citizens. With the launch of The Weather Channel in 1982, movies such as Twister in 1996, and the recent highly publicized Vortex 2 project, there has been an explosion of interest in meteorology and storm chasing over the last few decades.

Since I began chasing 10 years ago at the age of 13, storm chasing has evolved very rapidly for me personally and also for the rest of the chaser community. My first trip to the Plains in 2000 was basically a shot in the dark. I had no experience looking at computer models and made a wild guess on when to begin my week long trip. Thankfully I was able to see my first funnel cloud even though only one day of the trip featured severe weather. From that point on I was hooked forever. On that particular trip my family and I chased the old fashioned way using a road atlas, a radio, and our eyes. Occasional stops at truck stops or gas stations included watching The Weather Channel for severe thunderstorm and tornado watches. In retrospect I realize that chasing with a lack of available resources and meteorological knowledge was probably not the safest idea, but that's how I got started.

From 2000 through 2009 I was fortunate enough to have annual storm chase trips to the Plains with my parents. A tremendous leap in technology occurred over that time period, and every year I acquired new gadgets that helped make my chases more productive and efficient. In 2001 I brought along a small color TV that proved useful for watching local severe weather coverage. The purchase of a laptop in 2003 provided me with access to a wealth of information through internet access at hotels. With the internet I was able to read the forecasts from the Storm Prediction Center and also make my own predictions. Unfortunately that year my car got heavily damaged by baseball sized hail due as a road suddenly came to a dead end. I realized that I needed street level mapping software and a GPS receiver to prevent future problems of this nature. These items were included during my 2004 chase along with mobile internet through a cell phone connected to my laptop. What could be better than having access to radar data in the field? Perhaps live streaming video of storm chasing? With mobile internet coverage and speed increasing dramatically in the late 2000s, streaming video is now perhaps the newest and most exciting twist in the world of storm chasing.

With the technology boom and increased publicity over the last 10 years, chasing has become quite popular. I have noticed a steady and dramatic increase in the number of chasers roaming Tornado Alley. Tornado warned storms rarely go undocumented in the Plains these days, and while the NWS enjoys the benefits much more warning verification and storm documentation, chasers are gradually becoming more frustrated by the crowds that are gathering near storms. When tornadic storms are in progress, the ridiculously congested rural roads of western and central Oklahoma are almost an unbelievable sight. Modern technology is without a doubt having an impact on chasing since the majority of chasers have access to radar and street level mapping. Main roads are becoming parking lots, and some states are now restricting traffic around storms. With the attention given to severe weather by the media, curious local citizens are flooding the roads, adding to the congestion. I much prefer chasing later in the season in an attempt to avoid the large crowds.

Storm chasing is my escape, allowing me to forget about anything that is bothering me. I am captivated by the sights and sounds associated with severe thunderstorms. From the perspective of a meteorologist, comparing radar data while viewing a storm at close range is a tremendous learning experience. Now that I have achieved my goal of becoming a meteorologist, I believe storm chasing has given me an advantage when it comes to predicting and monitoring severe weather as a NWS employee.



Above: Photo taken by Matt in Western Kansas on May 22, 2008



JUNE 2ND SEVERE WEATHER RECAP

During the late afternoon on June 2, 2010, thunderstorms developed over central Texas and the Sierra Madre of Mexico. At 7 pm CDT, the first line of severe thunderstorms entered the Rio Grande Valley and produced hail up to the size of nickels, localized flooding and strong winds. The second line of thunderstorms extended across much of Central Texas and began accelerating and tracking southward from Tilden to Goliad by late in the evening. The two lines of thunderstorms merged around Tilden and Choke Canyon Reservoir near 1000 pm CDT causing intensification to the convective complex of storms. The strongest portion of the solid line of thunderstorms continued southeastward into the central Coastal Bend. Reports of trees down and power outages increased from along I-37 to Corpus Christi from the most intense portion of the line of thunderstorms. WSR-88D detected small areas of rotation over Aransas, San Patricio, Refugio and Nueces Counties, where four separate tornadoes touched down. This included an EF-2 tornado, with speeds of 120 mph in Aransas County. Straight-line winds produced widespread damage to trees and power lines across Nueces county, where up to 65,000 customers were left without power. Wind speeds of up to 90 mph were estimated over NAS Corpus Christi, Flour Bluff, and Padre Island. Six people were injured at NAS Corpus Christi when several recreational vehicles were flipped. For more information on this event visit:

www.srh.noaa.gov/crp/?n=severewindo060310

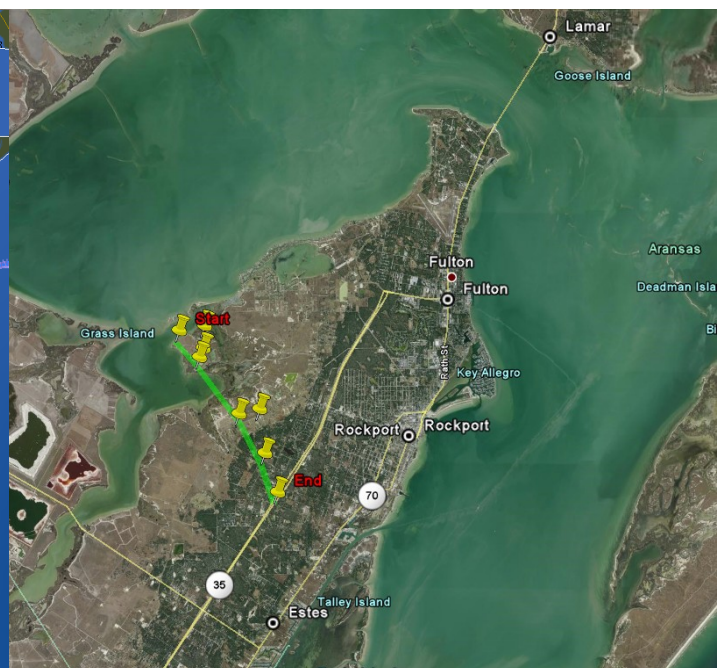
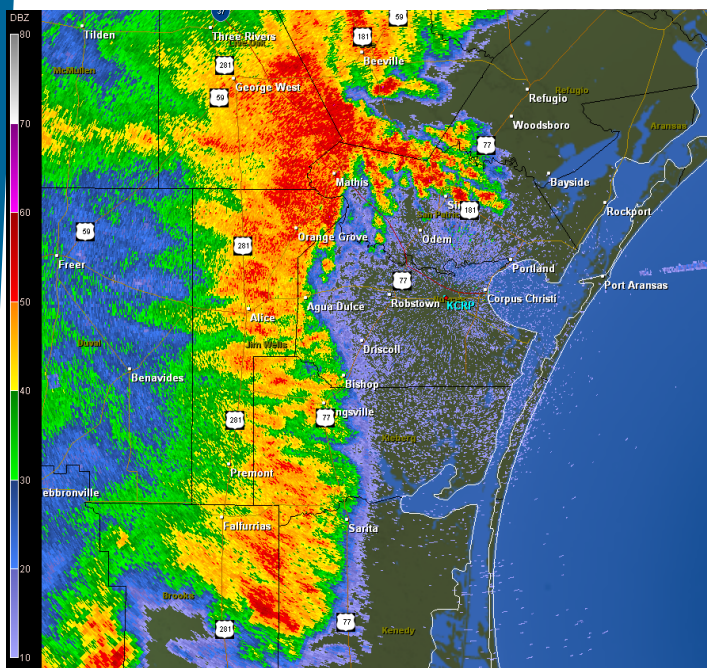
AND

www.srh.noaa.gov/crp/?n=southtxtornado060210



Above: Severe storms flipped a RV flipped onto a vehicle at NAS CC and snapped a power pole in Aransas County

Below: Radar imagery of a the June 2nd severe MCS approaching the Coastal Bend and a plot of the path of an EF-2 tornado through Aransas county.





SCIENCE SCOOP

Using arcGIS to analyze intense rainfall and severe flooding in parts of South Texas for April 12-17 2010

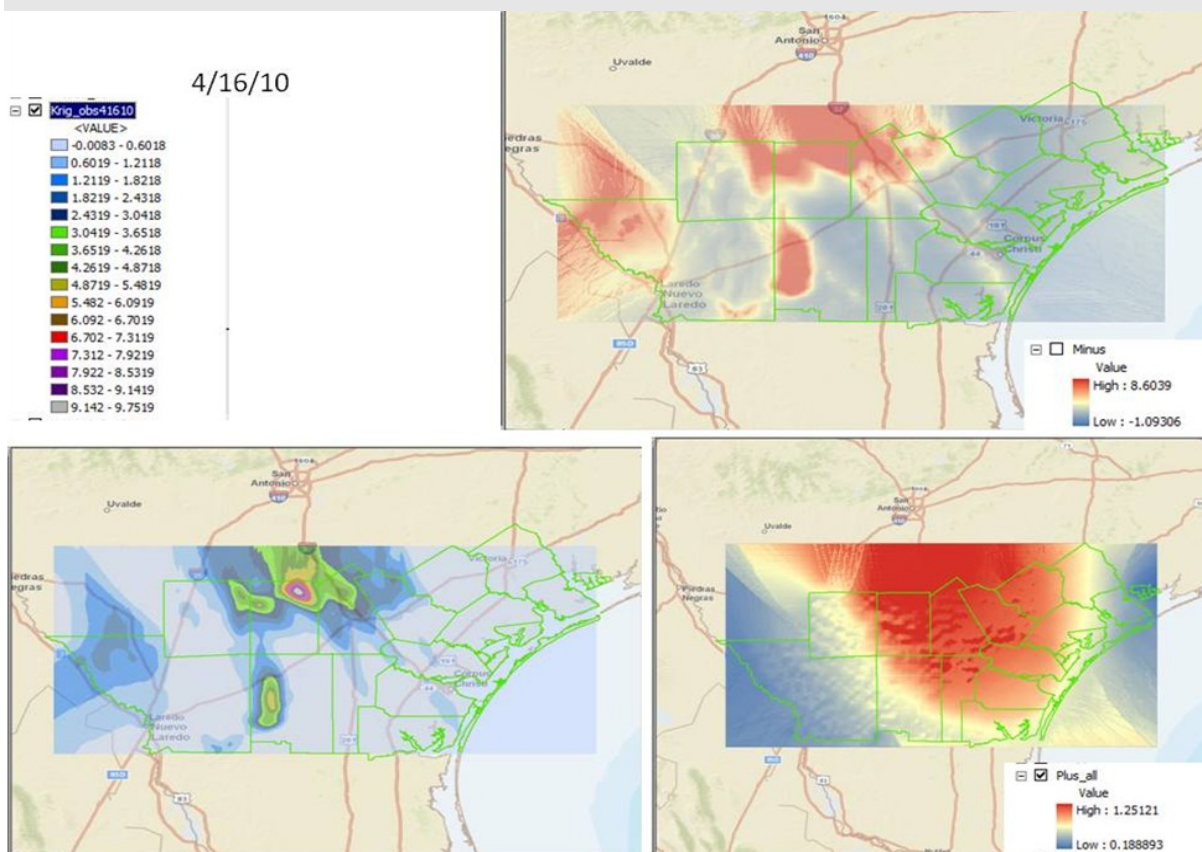
By Alex Tardy—Science and Operations Officer

A period of intense convective rainfall occurred across interior South Texas April 12-17, 2010. Localized total rainfall around 20 inches was observed with maximum 12 hour amounts of 6 to 12 inches. Soil conditions were near normal due to a wet and cool winter and the intense rainfall resulted in excessive runoff into the Nueces River Basin. Lake Corpus Christi, the collection point for this river basin, rose 30 percent bringing it to 90 percent capacity. The greatest rainfall amounts occurred in the Frio river system and caused 5 foot water level rises in Choke Canyon Reservoir.

Flash flooding was also a significant impact and caused road closures and damage, extensive field flooding, home and park flood damage and the need for high water rescue operations. This was most severe on April 16 when widespread flooding occurred around Orange Grove. Areal flood surveys revealed extensive water inundation across parts of Jim Wells County and the slow flowing water had lingering standing water or downstream effects well after the heavy rainfall.

In order to better analyze this and similar events, the National Weather Service began a collaboration project which used GIS expertise from a Del Mar College student and the City of Corpus Christi emergency management. ArcGIS tools were used to analyze quantitative precipitation estimates (QPE) and compared to quantitative precipitation forecasts (QPF). The goal of the study was to analyze the severity of the rainfall events, better understand the impacts, compare WSR-88D rainfall estimates, verify the official digital forecasts to demonstrate value, and to develop real-time GIS analysis displays that may aid in heavy rainfall situation awareness and information sharing with partners. The result of the project aims to improve operational forecasting and decision support services during precipitation events.

Below: Example of a GIS display depicting observed precipitation at 7 am April 16, 2010 (lower left). Adjacent to this image is the forecast rainfall (lower right). The top image is the difference of the two or the error (red values are underforecast). Values are inches of rainfall.





STAFF SPOTLIGHT



Zach Finch

NWS Corpus Christi's Newest Meteorologist Intern

Zach is the new meteorologist intern at the WFO in Corpus Christi, TX. He was a student volunteer for the National Weather Service at WFO San Diego and Cheyenne. Zach recently obtained his Masters degree from Colorado State University and received his Bachelors degree from UCLA three years earlier. His thesis research looked at upper-level lows that affect northern Mexico during the summer monsoon. Zach enjoyed the variable weather along the Colorado Front Range where there could be thunderstorms and snow all in one day. Storm chasing also became an avid interest and he saw his first tornado outside Cheyenne. Growing up in San Diego, Zach attributes his initial interest in weather to the heavy rains that fell in SoCal during the 97-98 El Niño winter. Watching the Weather Channel as a young kid also increased his fascination with meteorology. In his free time, Zach enjoys bicycling, exercising, watching sports, and going to the beach. You can find him rooting for the San Diego Chargers and UCLA Bruins. He is excited to join the WFO staff in Corpus Christi. Welcome to Corpus Christi Zach!

ADDITIONAL ITEMS

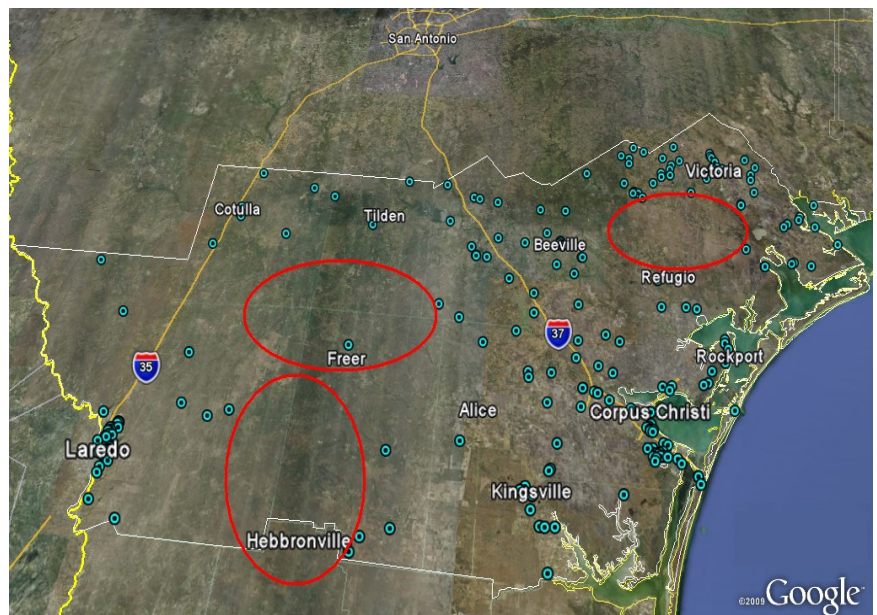
A Call for More CoCoRaHS Observers

By Tony Merriman—Forecaster

The South Texas CoCoRaHS rainfall network has over 210 observers! The National Weather Service in Corpus Christi would like to thank everybody who has joined and report their rainfall amounts. We really appreciate the time and effort you put into measuring and reporting your rainfall amounts. The data you supply is very valuable not only to meteorologists, but also to researchers.

We would like to continue expanding the network. If you have any friends or relatives who would like to participate, please tell them about the program and have them sign up. We really need observers in the areas circled in red on the map below. Once your friends or relatives fill out the application at the following website <http://www.cocorahs.org/Application.aspx> they will receive a **free** rain gauge from the National Weather Service.

If you have any questions about the program, please email Tony Merriman at Tony.Merriman@noaa.gov. Thanks again for all your hard work and dedication! We at the National Weather Service really appreciate it!



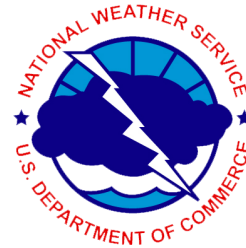
Above: Needed rainfall observers in areas circled in red

www.weather.gov/corpuschristi

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Pictures Below:

Top Left: Satellite of Hurricane Celia making landfall near Corpus Christi in 1970

Top Right: Tracks of 4 tornadoes that touched down in South Texas on June 2nd, 2010

Bottom: Precipitation estimates from April 2010 flooding

